



# Addressable Office Lighting and Control

Damon Wood, CLEP, LC  
Ledalite Architectural Products  
Energy Technologies Group

June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)



## Workspace-Specific Luminaire

---

One direct-indirect luminaire per standard workstation

Positioned directly over work area

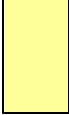
Puts light where it is needed

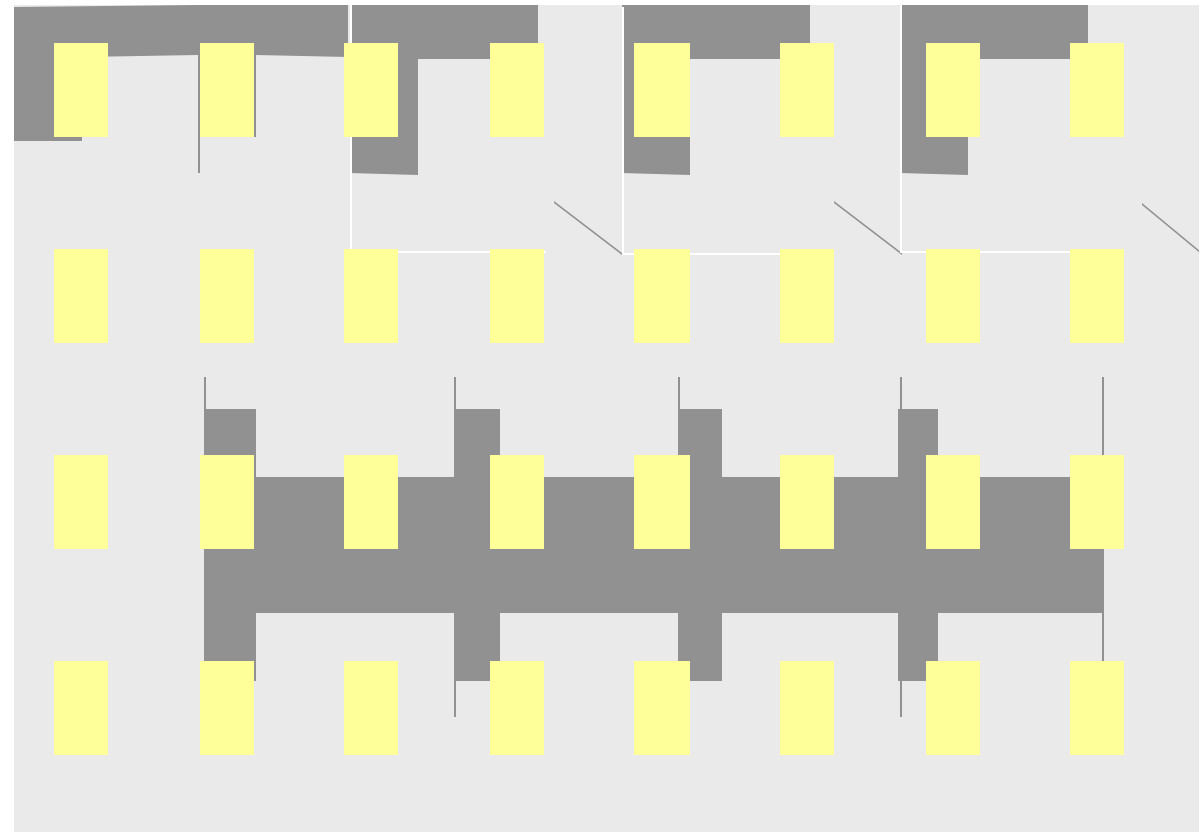




# Standard Troffer Layout

---

 32  
Troffers



June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)

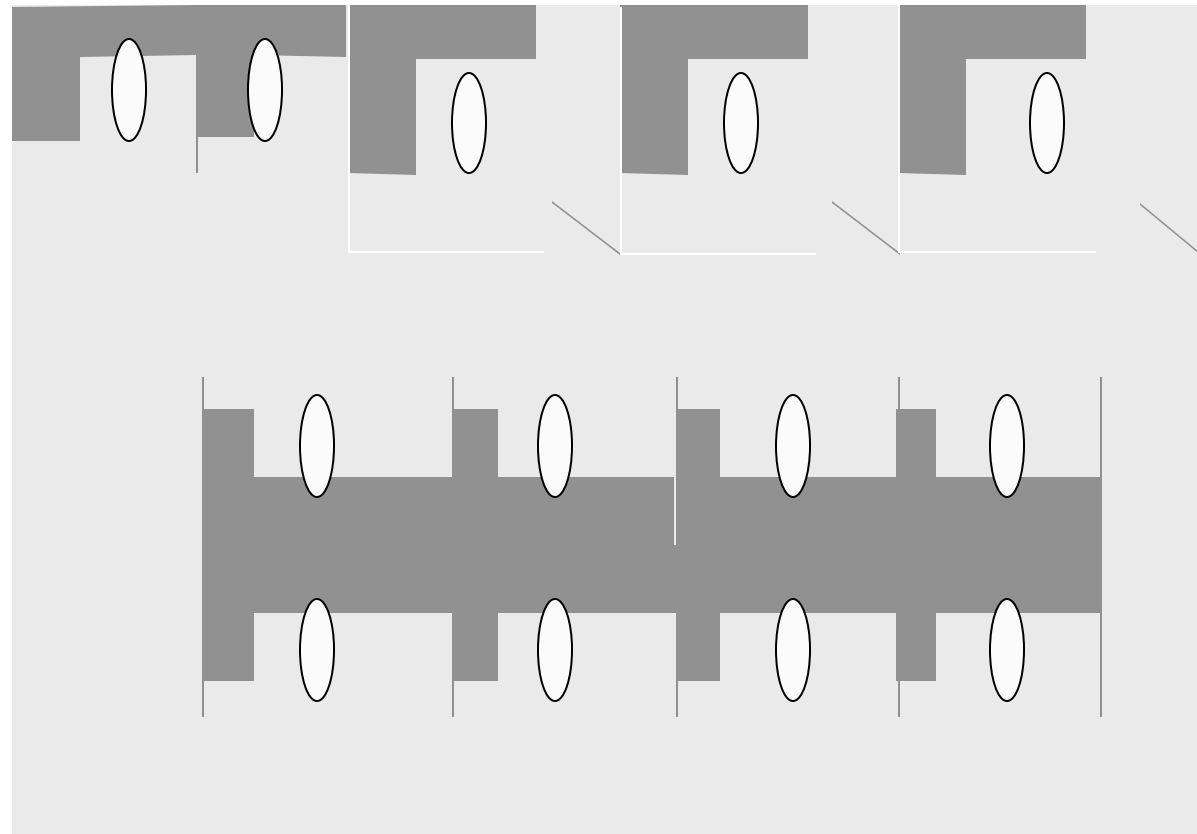


# Workspace-Specific Layout

○ 13 Fixtures

One per  
workstation  
means fewer  
fixtures

As low as 0.6  
Watts per  
square foot



June 3-6, 2001

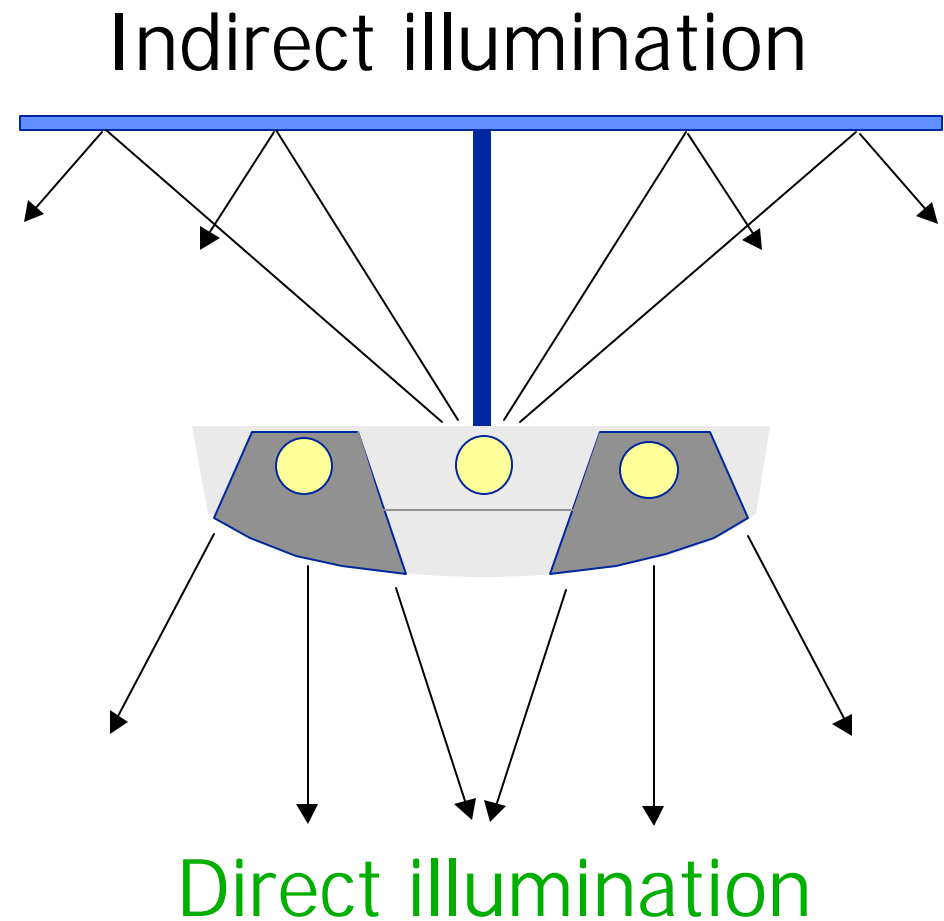
[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)



# Balanced Illumination...

Outer lamps provide  
workspace-specific direct  
illumination

Indirect illumination for  
lighting adjacent circulation  
areas





# Cubicle Illuminance

---

## Cubicle Size

Ceiling Height

	8' x 6'	8' x 8'	8' x 10'
8'	67.3 fc	59.7 fc	52.0 fc
9'	62.2 fc	56.3 fc	49.0 fc
10'	62.1 fc	55.9 fc	48.6 fc
11'	59.9 fc	54.5 fc	47.6 fc
12'	57.3 fc	53.1 fc	46.2 fc



# Workspace-Specific Control

constant ambient light



**Personal Dimming**



**Occupancy  
Dimming/Switching**



**Daylight Dimming**

June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)



# Personal Dimming Control

---

On-screen control panel

Users select preferred light level



June 3-6, 2001

[www. energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)





# Why Personal Control?

---

Better visibility, enhanced productivity

Fewer employee complaints

Employee recruitment and retention

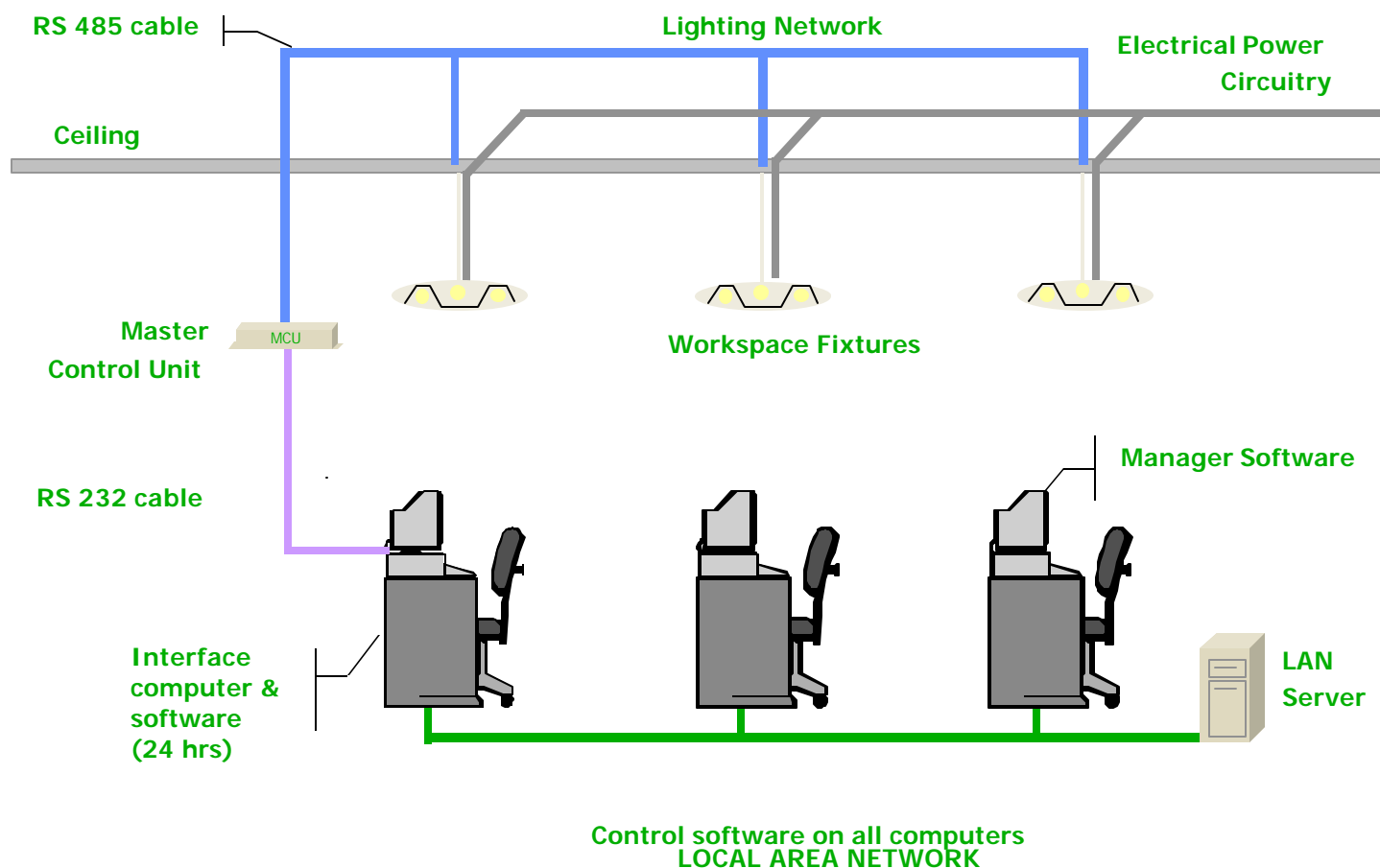
June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)





# Lighting Network Control



June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)



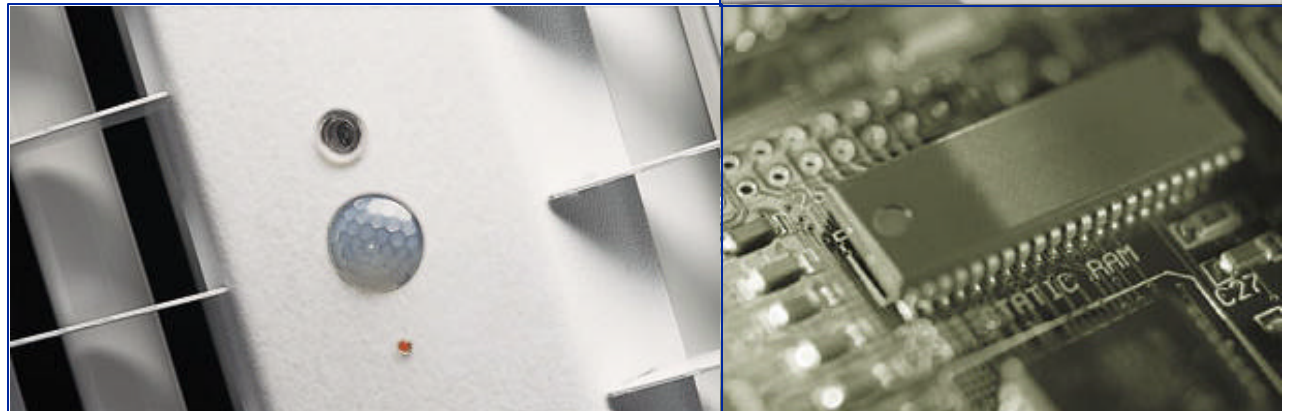
# Occupancy Sensing

---

Overhead sensor location means  
reliable sensing

Gradually dims outer lamps after  
time delay

Holds at minimum level before  
turning lamps off



June 3-6, 2001



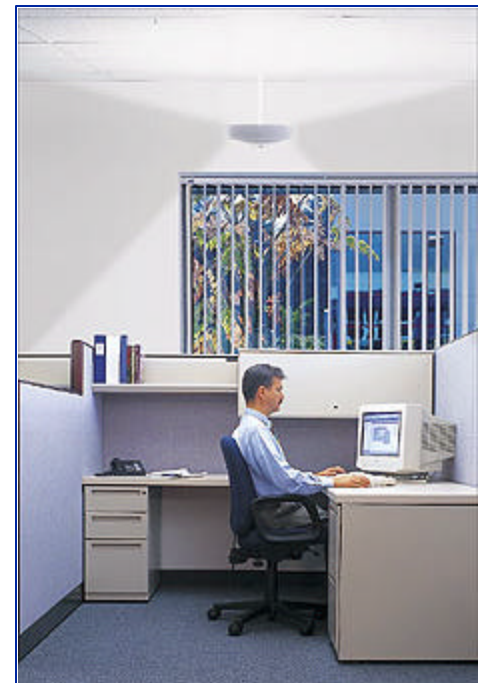
# Daylight Dimming

---

Saves additional energy in  
window-adjacent locations

Gradual dimming avoids sudden  
changes in light level

Maintains constant light level at  
work plane





# Centralized Control

---

## Light Scheduling

- scheduled occupancy sensor control
- scheduled load shedding

## Load Shedding

- minimize peak electricity costs
- respond to "real-time" price signals



# Energy Monitoring

Monthly Energy Report - October 1998

Energy Summary

Energy Consumption:	9953.9	kWh
Peak Demand	54.127	kW
Energy Charge	\$ 0.0732	per kWh
Monthly Peak Demand Charge:	\$ 8.00	per kW
Total Electricity Cost	\$ 1161.64	(for the month)
Daily Average Electricity Cost	\$ 52.80	

OK

Energy Summary

June 3-6, 2001

[www.energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)



# Life-Cycle Cost

---

Cost-effectiveness influenced by:

- ratio of base-case lamps to workstations
- hours of operation
- electricity rates

In new construction and renovation projects, this approach nearly always yields the lowest life-cycle cost





**Thank You!**

June 3-6, 2001

[www. energy2001.ee.doe.gov](http://www.energy2001.ee.doe.gov)